

## ABSTRACT OF THE DISCLOSURE

A color enhancement method for use in a video camera imaging system(10,30) in the context of non-uniform lighting includes an adaptive algorithm (100 - 110) for developing a shutter speed control signal, analog gain control signal and color balance signals from pixel luminance over one field of video. The control signals developed during one field are used to control the camera (12) during the next field. The speed control signal and analog signal are determined based on the luminance signal obtained in digital form from the video camera, and analyzed over at least one field of video. During one field, the speed control signal and the analog gain signal target dark areas of the image and during the next field they target the bright areas of the image so that, over two fields, every pixel is within a workable range of luminance in at least one of two alternate fields. As the color balance settings for the fields are adjusted according to the exposure settings and the luminance level, consistent hue values are maintained between alternate fields. Additionally, a pixel color detection circuit (18,28) examines each pixel from the video camera (12) to determine whether it is in a color region of interest. The pixel color detection circuit uses a color offset signal, calculated by a controller (16,60) based on the luminance signal during the preceding field. The color offset signal indicates how far from neutral, or white, in the chosen color space, is the chrominance data from the camera. The video camera and pixel color detection circuit may be used to identify weeds or plant material on the ground. A controller (74) is responsive to the pixel color detection circuit and activates one or more spray nozzles ((68,70) when a weed is detected.

Figure 2